ENGINEERING REPORT

REPORT SERIAL NO.	1720	
DATE	PAGE	OF
2-4-75	1	8

Electrical Components Division — The Bendix Corporation — Sidney, New York

NAME OF EQUIPMENT
INTERFACIAL INSERT FOR ELECTRICAL CONNECTORS

TYPE & PART NO.

SERIAL NO.

CUSTOMER'S NAME & ADDRESS
Lyndon B. Johnson Space Center, NASA
R & T Procurement Branch
Houston, Texas 77058

NASA CR- 141728

CUSTOMER'S PART NO.
TERMINATION REPORT
FOR PROJECT 70886
NAS 9-13899

PURPOSE

Provide connector assemblies and perform design evaluation as required by NASA Contract NAS9-13899 and Bendix Technical Proposal 1003.

SUBJECT

1. Connector Assemblies

1.1 25 interfacial insert assembly kits (L-25274-603) have been shipped per contract requirements. Each assembly consists of one interfacial insert with an interfacial seal on one side, pin contacts molded in place, two mating socket insert assemblies and 42 socket contacts for assembly into socket inserts.

The interfacial insert and ancillary components were designed to be assembled into modified MIL-C-26482 series II connectors to be provided on a possible follow up contract.

2. Design Evaluation

2.1 Conclusions

2.1.1 The samples and testing performed on this program indicated that the interfacial insert L-25274-604 can be assembled into specially modified MIL-C-26482 series II connectors.

2.1.2 The interfacial insert concept can be utilized in many other standard series connectors.

2.1.3 One electrical connector, together with an assembly tool not required by this contract, has been modified and built to accept an interfacial insert. This connector will be sent to Bob Hendrix, Technical Monitor. The connector will mate with any MIL-C-26482 plug assembly having the 22-21S arrangement in the normal position.

2.2 Design Comments for Future Development

2.2.1 Interfacial inserts manufactured for this contract were made from standard hard epoxy molds. New molds should be made to provide a contour more suitable for insertion and removal of the interfacial insert. The molding gate should be reduced in size so it can be trimmed below the sealing surface.

PREPARED	D. MacInnes	APPROVED	D. MacInnes	APPROVED		APPROVED	
DATE	2-6-75	DATE	2-6-75	DATE		DATE	

SC-654

DEFIANCE NO. 118 37468

2.2.2 A more reliable insert-to-seal bond must be incorporated. The one used on these samples did not survive the temperature life testing.

2.2.3 The interfacial insert L-25274-604 is visually aligned and positioned in the shell. An assembly tool is used to seat the interfacial insert in the shell. A visual check is required to assure that the interfacial insert is properly seated.

2.2.4 Future testing of interfacial inserts made from new molds, assembled in modified shells and mated with standard connectors of the type desired to be qualified will be required to assure the design's performance.

2.2.5 During testing, particular attention should be given to the circumferential seal after exposure to the environments for excess wear of contacts and maintenance of insert position during and after all testing.

2.2.6 For connectors not having asymmetrical insert patterns with respect to the main key or keyway, the standard socket insert can not be used in the interfacial insert connector.

2.2.7 See L-25274-604 & L-25274-602 for illustration and modification dimensions for interfacial insert, modified plug and receptacle connector assemblies.

2.3 Study Requirements

2.3.1 Upon receipt of NASA's request to quote on the interfacial insert for electrical connectors, a review of the concept was undertaken. Various methods of inserting the interfacial insert and retaining it in a modified shell were considered. Methods investigated included separate inserts with an extra threaded retaining member or locking springs.

It was decided that the best way to meet the design requirements and provide an economical end unit, the locking mechanism and interfacial insert should be one unit. Bendix proposal No. 1003 "Interfacial Inserts for Electrical Connectors" was submitted and accepted by NASA for prototype assembly.

The approach chosen by Bendix offers the following design features:

a. Retention device is molded as part of interfacial insert
b. Interfacial insert is molded using silicone rubber - different rubber materials can be used to accommodate special environmental situations such as unusual temperature extremes or unusual fluid immersion requirements.
c. Shell length increased by .600 inch.
d. Standard insert assembly components and assembly procedures can be used for retaining the socket contact insert assembly in the modified shell.

e. The increase in weight of a connector assembly for a 22-21 arrangement will be .150 pounds.

f. Only one interfacial seal will be required since the molded rubber insert will provide a circumferential seal at shell I.D.

g. Connectors with interfacial inserts will mate with standard connectors. The interfacial inserts manufacured in this study are designed for use in modified MIL-C-26482 series II connectors.

2.4 Concept Comments

2.4.1 The following comments are applicable to the interfacial insert with regard to anomalies and advantages listed in the Disclosure of Invention Attachment 2 of subject contract.

2.4.1.1 Defects such as damaged seals, recessed contacts and bent or broken pins present a serious problem for any connector assembled on final system hardware.

2.4.1.1.1 The interfacial insert can do much to eliminate the cause of damaged seals and bent or broken pins due to improper assembly, since contacts are molded in place and seals are assembled over pins. The problem of damaged seals and bent or broken pins after assembly is eliminated since interfacial inserts are easily removed and replaced with new interfacial inserts without removing connectors from harnesses or housings.

2.4.1.1.2 The interfacial insert will have no effect on the problem of recessed contacts since this is strictly a problem of improper assembly.

2.4.2 The advantages as stated in the disclosure of invention will be discussed in the order in which they appear.

2.4.2.1 Increased Reliability - It is true that problems caused by the above anomalies will be reduced to a minimum with the incorporation of the interfacial insert. However, the amount of contacts required to make an electrical connector will increase by 50%, mating connections will increase by 100%, one additional assembly will be required and a sealing joint will also be added. It is felt that without the benefit of final design testing and in the absence of field use data the reliability will be similar to the connector being replaced.

2.4.2.2 Simplified Maintenance - The prime objective is to simplify maintenance by minimizing the effect of the stated anomalies. This interfacial insert will provide an easy means of replacing damaged interfacial seals or contacts, without costly reworking of assembled and sealed systems.

2.4.2.3 Interfacial Seal Damage due to Contact Installation or Removal Tools - The interfacial insert provides a molded-in contact, eliminating the problems of contact insertion and removal.

2.4.2.4 Elimination of Damage to Interfacial Seals due to Bonding to a Rigid Surface - It is not felt that this is an advantage since most interfacial seals are bonded to rigid surfaces. It should be noted that, in the design proposed by Bendix, the interfacial seal is bonded to a resilient member. It is the elimination of assembly and disassembly in the interfacial seal area that will reduce seal damage.

2.4.2.5 Reduction of Recessed Pins - It is not felt that this problem is reduced since the design only replaces insertable pins with insertable sockets.

2.4.2.6 Reduction of Pin Bending by Using a Harder Pin Material - Due to the molding operation, contact materials will be of the same hardness for size 20 and size 22 contacts, and size 16 contacts will be somewhat softer using the molded in contacts as opposed to crimp contacts. Note that because the pin contacts are molded in a resilient insert the bending moment due to probe type damage will be reduced.

2.4.2.7 Ease of Replacing Insert - Defective insert assemblies are easily removed by pulling gently with a long-nosed pliers or similar tool on various contacts in turn, so as to ease the assembly out of its shell. A new insert assembly can readily be assembled by visually aligning insert with pattern and setting in place by use of a simple hand tool.

2.4.2.8 Stocking of Only Socket Contacts and Tools - The interfacial insert will eliminate the need to stock individual pin contacts. However, interfacial inserts will have to be stocked. Tools for contact insertion and removal are usually common for both pins and sockets so this is only a very minor problem. Also, the interfacial insert requires its own assembly tool.

2.4.2.9 Only Socket Contacts on Harnesses to be Exposed - The interfacial insert will eliminate the need to have exposed pins on harnesses during harness manufacturing.

2.4.2.10 Crimp Tools - Usually only one crimp tool is required for either pins or sockets.

2.4.2.11 Selective Plating to Change Wear Patterns - Rather than change platings to shift wear areas, it is suggested to use standard platings and when pin surfaces wear, replace the interfacial insert, utilizing interfacial insert as a connector saver.

2.4.2.12 Interfacial Insert Connectors-Modified Standard Connectors - While the changes to the standard shell are simple, the interfacial insert connector can not be made from standard shells. Insert assemblies symmetrical about the main key or keyways and socket contacts are standard components, and normal assembly methods can be used.

2.4.2.13 Hermetic Applications - Interfacial inserts with pins on one end and sockets on the other could be utilized on hermetic assemblies. It might be advantageous to use socket hermetic connectors and mate with standard interfacial insert assembly connectors.

2.4.3 The disadvantages as stated in the disclosure of invention will be discussed in the order in which they appear.

2.4.3.1 Increase in weight and length - The increases in weight and length for a MIL-C-26482F series II wall mount having 21 size 16 contacts will be .15 pounds and .600 inches. The effect of this increased weight against the gain of easily repairing damaged connectors must be evaluated for each application.

2.4.3.2 Cost of adding an extra interfacial seal - In the Bendix proposal only one interfacial seal is required. This is accomplished by using the resilient insert to provide a circumferential seal with the shell.

2.4.3.3 Tooling costs - Costs to implement the interfacial insert must be compared with the saving in eliminated down-time caused by damaged pins.

2.4.3.4 Increase in contact resistance - While there will be an increase in contact resistance of a mated connector, it should be noted that on the units tested the contact resistance upper control limit did not exceed the specification requirements.

2.5 Test Program

2.5.1 Samples

15, L-25274-604 Interfacial Inserts
4, 10-483523-21S Standard Socket Inserts
84, 10-497007-16H Standard Socket Contacts

2.5.2 Test Schedule

2.5.2

Test Schedule
Interfacial Inserts Only
L-25274-604

Sample	Insulation Resistance	High Potential	Contact Resistance	Contact Retention	Insertion Forces Interfacial Insert Simulated Shell	Interfacial Insert Removal	Contact Retention Destruction	Temp Life	Contact Retention	Insertion Forces Interfacial Insert Socket Insert	Thermal Shock	Contact Retention
1	X	X	X	X								
2	X	X		X	X	X						
3	X	X		X	X	X						
4	X	X		X			X					
5	X	X		X			X					
6	X	X		X			X					
7	X	X		X			X					
8	X	X		X			X					
9	X	X		X			X					
10	X	X		X				X	X			
11	X	X		X				X	X			
12	X	X		X						X		
13	X	X		X						X		
14	X	X		X							X	X
15	X	X		X							X	X

2.5.3 Test purpose - The above samples and test schedule are to provide preliminary information on the suitability and possible design problems for incorporating the interfacial insert in a modified connector.

2.5.4 Test Description - Paragraph references are in MIL-C-26482F unless otherwise noted.

2.5.4.1 Insulation Resistance Par. 3.6.7.1., Par. 4.6.8.1 except samples are not wired.

2.5.4.2 High Potential Par. 3.6.9.1, Par. 4.6.10.1.

2.5.4.3 Contact Resistance - Record contact resistance after wiring two standard socket contacts (6 in. method) and mating sockets to both sides of the pin contact at .100 in from the interfacial insert body.

2.5.4.4 Contact Retention - Test two contacts per interfacial insert for contact retention. Apply loads to both ends of pin contact. Apply 20 pounds maximum load.

2.5.4.5 Insertion Forces Interfacial Insert to Simulated Shells - Record the axial force required to insert an interfacial insert into a simulated plug shell with a standard socket insert.

2.5.4.6 Interfacial Insert Removal - Remove interfacial insert from shell by applying small axial loads to the pin contacts.

2.5.4.7 Contact Retention to Destruction - Record the axial load at which the pin contact will be dislodged from the interfacial insert. Test four contacts per interfacial insert, two contacts from each side.

2.5.4.8 Temp Life - Par. 3.6.37 and Par. 4.6.37.

2.5.4.9 Insertion Forces of Interfacial Insert and Socket Insert - Record the axial force required to assemble interfacial insert into standard insert and contact assembly.

2.5.4.10 Thermal Shock - Par. 3.6.13 and Par. 4.6.13.

2.5.5 Test Results

2.5.5.1 Insulation Resistance - All units passed the 5000 megohm min requirement. See data sheet 1.

2.5.5.2 High Potential - All samples passed the high potential at 2300 VAC. See data sheet 2.

2.5.5.3 Contact Resistance - The combination of two mating joints and extra length did not cause millivolt drops in excess of the 45 MV drop min. See data sheet 3.

2.5.5.4 Contact Retention - Due to the resiliency of the insert material contact retention was not run to 25 pounds. The location of the contacts at a given load and the load required to obtain a given displacement was recorded. See data sheets 4 & 5. The reason for the larger displacements when applying pushout loads from the rear of the insert assembly is the interfacial seal is a softer rubber than the insert and was yielding under the pushout load. Displacement of the contact is occurring at .0055/pounds.

2.5.5.5 Contact Retention to Destruction - The average force to release the contacts was 7.96 pounds. See data sheet 8.

2.5.5.6 Temp Life - There was no damage to inserts, seals or contacts; however, the bond at the insert-seal interface did not hold up. The force to release contacts increased to 13.66 pounds average.

2.5.5.7 Temp Cycle - There was no damage to inserts, seals, contacts or bond joints. The force required to release the contacts was 7.64 pounds average.

2.5.5.8 Simulated Shell Insertion Forces - The forces to insert the interfacial insert into three different shell openings were recorded using an insert with a full complement of mating socket contacts to push the interfacial insert into position. The forces required to remove the interfacial insert by pulling on the mated insert were also recorded. See data sheet 6. The force to insert the interfacial insert into a standard insert and contact assembly was also recorded. See data sheet 7.

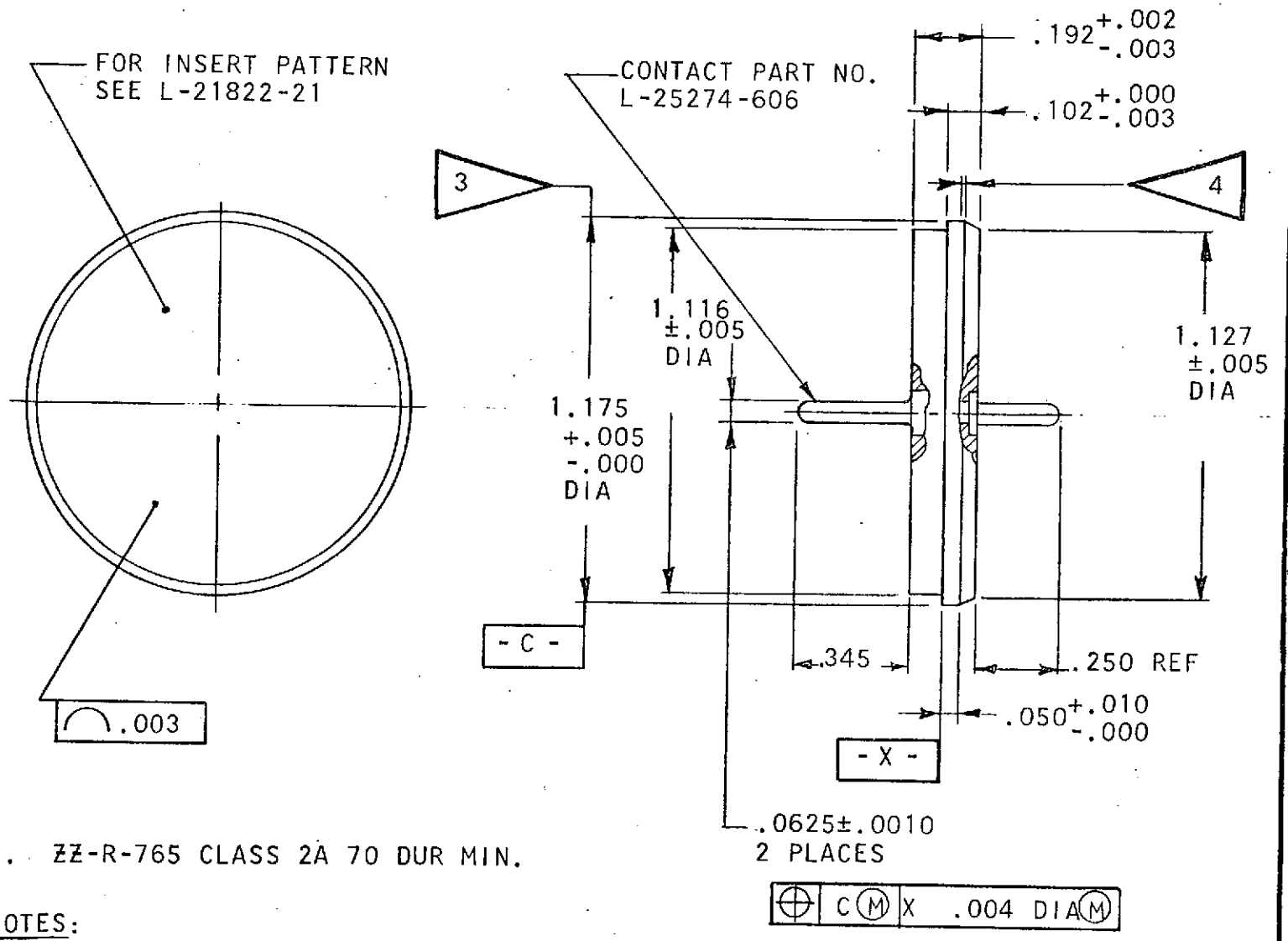
The results of this test indicate that a shell I.D. of 1.155 in. and an insert with a full complement of contacts installed in the shell would retain the interfacial insert in its required position after unmating an insert with a full complement of contacts.

A connector assembly utilizing an assembled insert, interfacial insert and an I.D. of 1.155 in. was mated and unmated 50 times with an insert with a full complement of contacts. The interfacial insert did not come out of the shell during the durability testing.

2.5.5.9 Interfacial Insert Removal - By applying small axial loads to the pin contacts of the interfacial insert, the interfacial insert was easily removed from an assembled connector.

L-25274-605

NEXT ASSEMBLY	REVISIONS			
	LTR	DESCRIPTION	DATE	APPROVED
	A3	REDRAWN, WAS C SIZE ECN:CNR	2-4-75 BARTKOW	



1. ZZ-R-765 CLASS 2A 70 DUR MIN.

NOTES:

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATES
LINEAR DIMENSIONS ARE IN INCHES TOLERANCES: .XXX ± .010 .XX ± .03 .X ± .1 ANGLES ± 2° OTHER STANDARDS PER 9-3800 AND MIL-D-1000. NOTE REF △	PREPARED BARTKOW	2-3-75
	CHECKED	
MATERIAL SPEC MOLDING COMPOUND SILICONE RUBBER SEE NOTE 1	MATERIAL	
	APPROVED	
PROCESS SPEC 9-3856-6 SEE NOTE 2	APPROVED	

The Bendix Corporation
Electrical Components Division
Sidney, New York

INSERT & CONTACT, PIN, MOLDED, ELECTRICAL CONNECTOR, TYPE JTC, .00005 GOLD PLATED CONTACTS

L

SIZE	CODE IDENT NO.	
A	77820	L-25274-605

SCALE	WT	REF	SHEET
NONE		10-258206 50-()P	1 OF 2

[L-25274-602]

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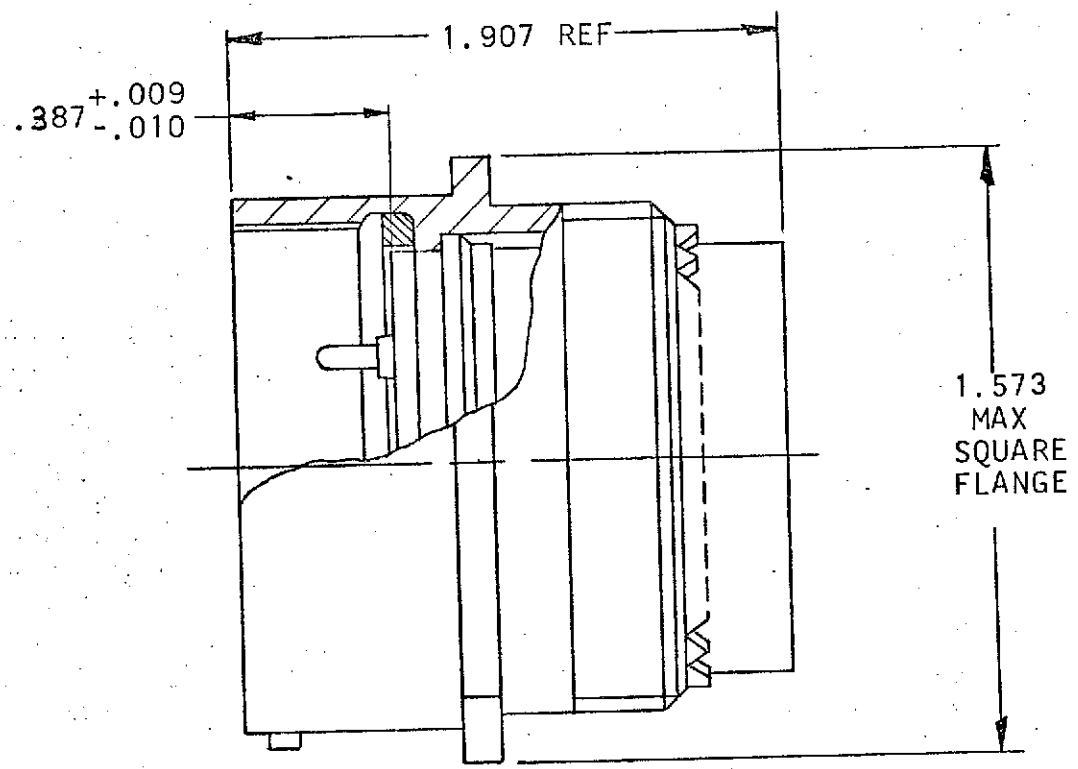
NEXT ASSEMBLY

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A1	———	———	———
A2	ADDED DIMENSIONS ECN: CNR	2-3-75 BARTKOW	



UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATES
LINEAR DIMENSIONS ARE IN INCHES TOLERANCES: .XXX ± .010 .XX ± .03 .X ± .1 ANGLES ± 2° OTHER STANDARDS PER 9-3600 AND MIL-D-1000. NOTE REF ◁	PREPARED A. HANNI	7-2-73
	CHECKED	
MATERIAL SPEC	MATERIAL	
	APPROVED D. MacAvoy	7-9-73
PROCESS SPEC	APPROVED	

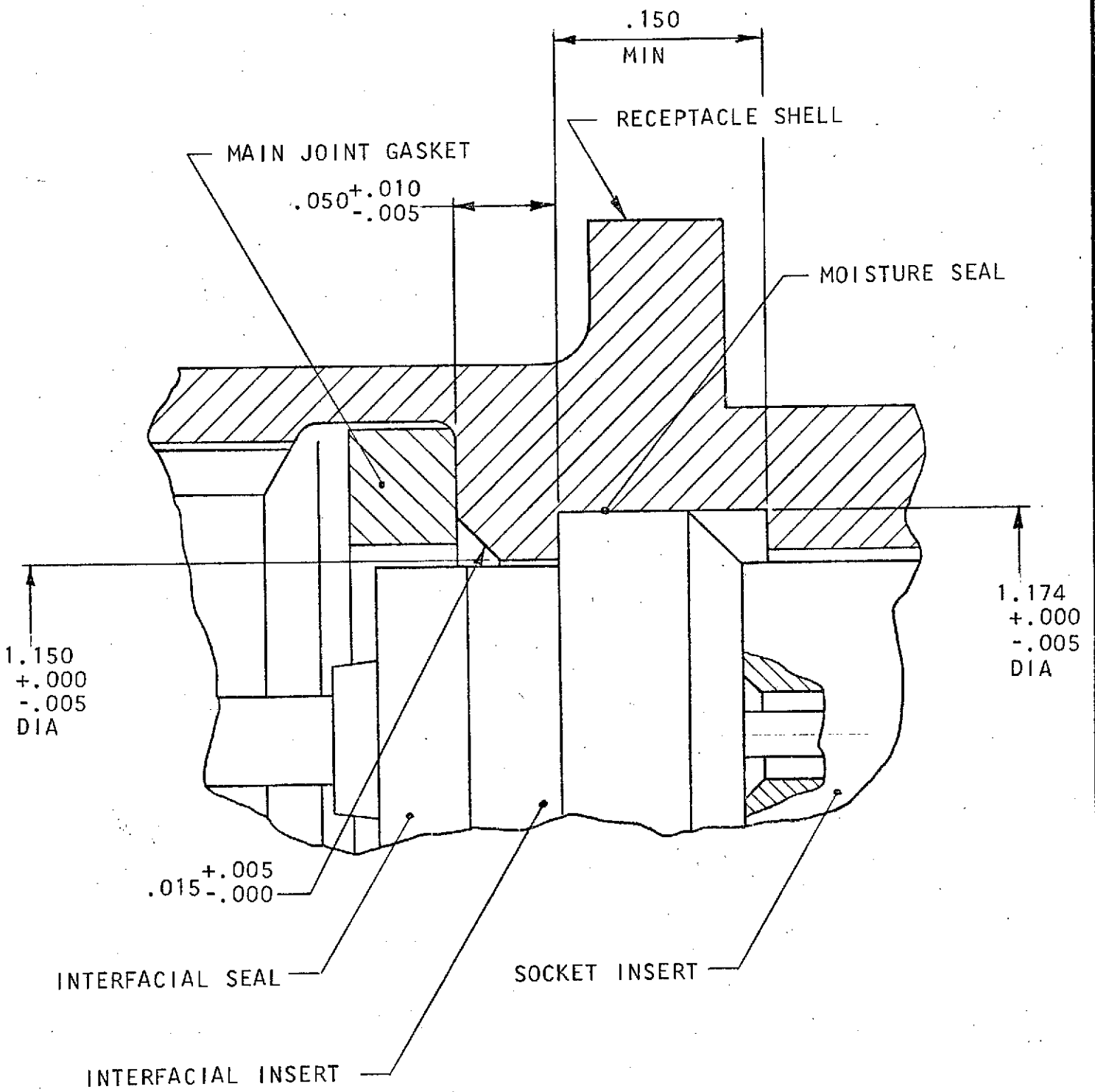
The Bendix Corporation
Electrical Components Division
Sidney, New York

U

INTERFACIAL INSERT,
ASSEMBLED IN MODIFIED
MIL-C-26482 CONNECTOR, SHELL SIZE 22

SIZE	CODE IDENT NO.	
A	77820	L-25274-602

SCALE	WT	REF	SHEET
NONE			1 OF 2



SIZE	CODE IDENT NO.	
A	77820	L-25274-602

REV SYM	A1	A2	SCALE	WT	REF	SHEET
			NONE			2

L-25274-603

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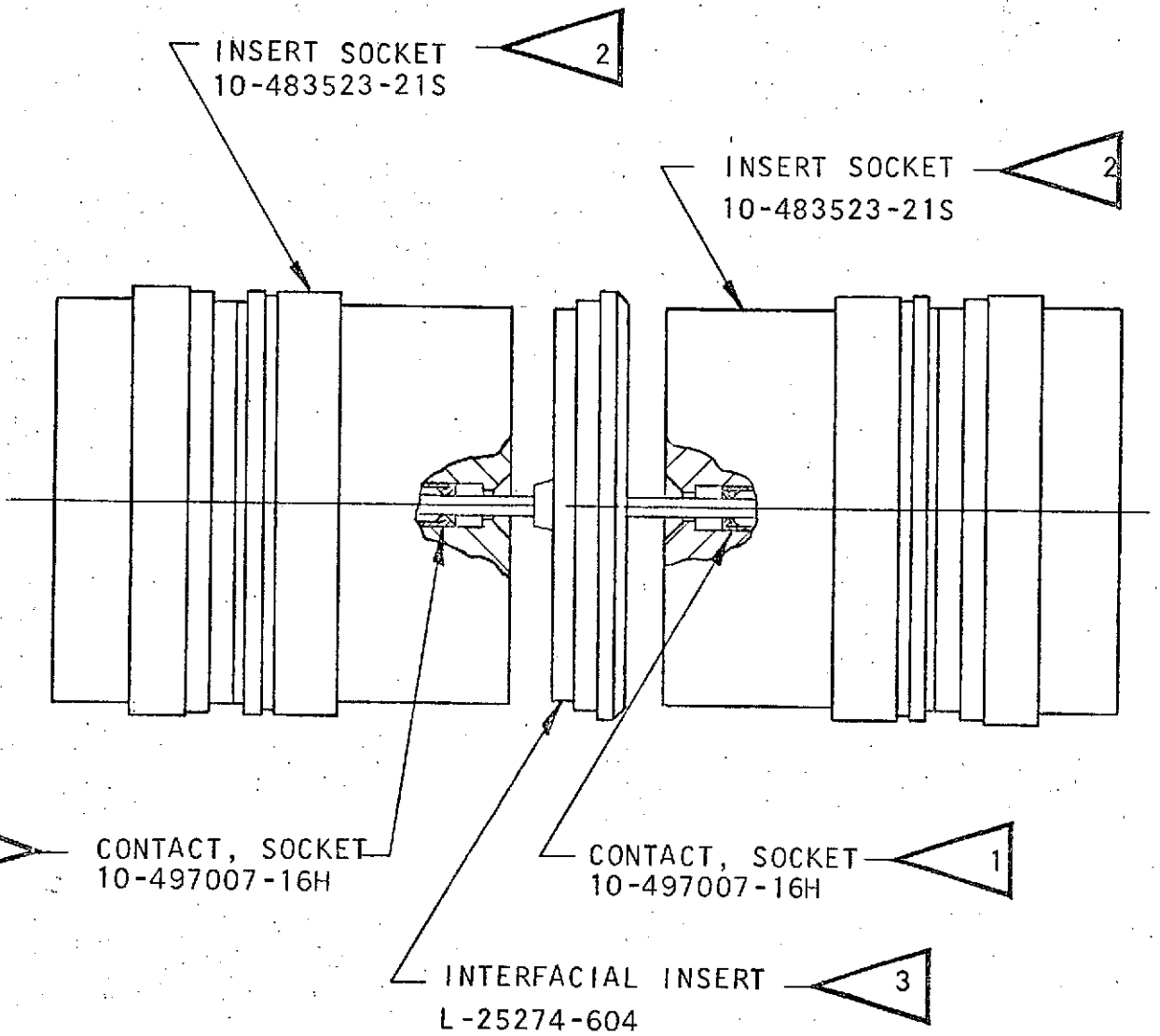
NEXT ASSEMBLY

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A1	———	———	———
A2	REVISED ECN: CNR	2-3-75 BARTKOW	



2. INSERTS SHIPPED UNASSEMBLED.

1. CONTACTS SHIPPED UNASSEMBLED.

NOTES:

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATES
LINEAR DIMENSIONS ARE IN INCHES TOLERANCES: .XXX ± .010 .XX ± .03 .X ± .1 ANGLES ± 2° OTHER STANDARDS PER 9-3800 AND MIL-D-1000. NOTE REF △	PREPARED A. HANNI	7-2-73
	CHECKED	
MATERIAL SPEC	MATERIAL	
	APPROVED D. MacAvoy	7-9-73
PROCESS SPEC	APPROVED	

The Bendix Corporation
Electrical Components Division
Sidney, New York

U

INTERFACIAL ASSEMBLY KIT

SIZE	CODE IDENT NO.	
A	77820	L-25274-603

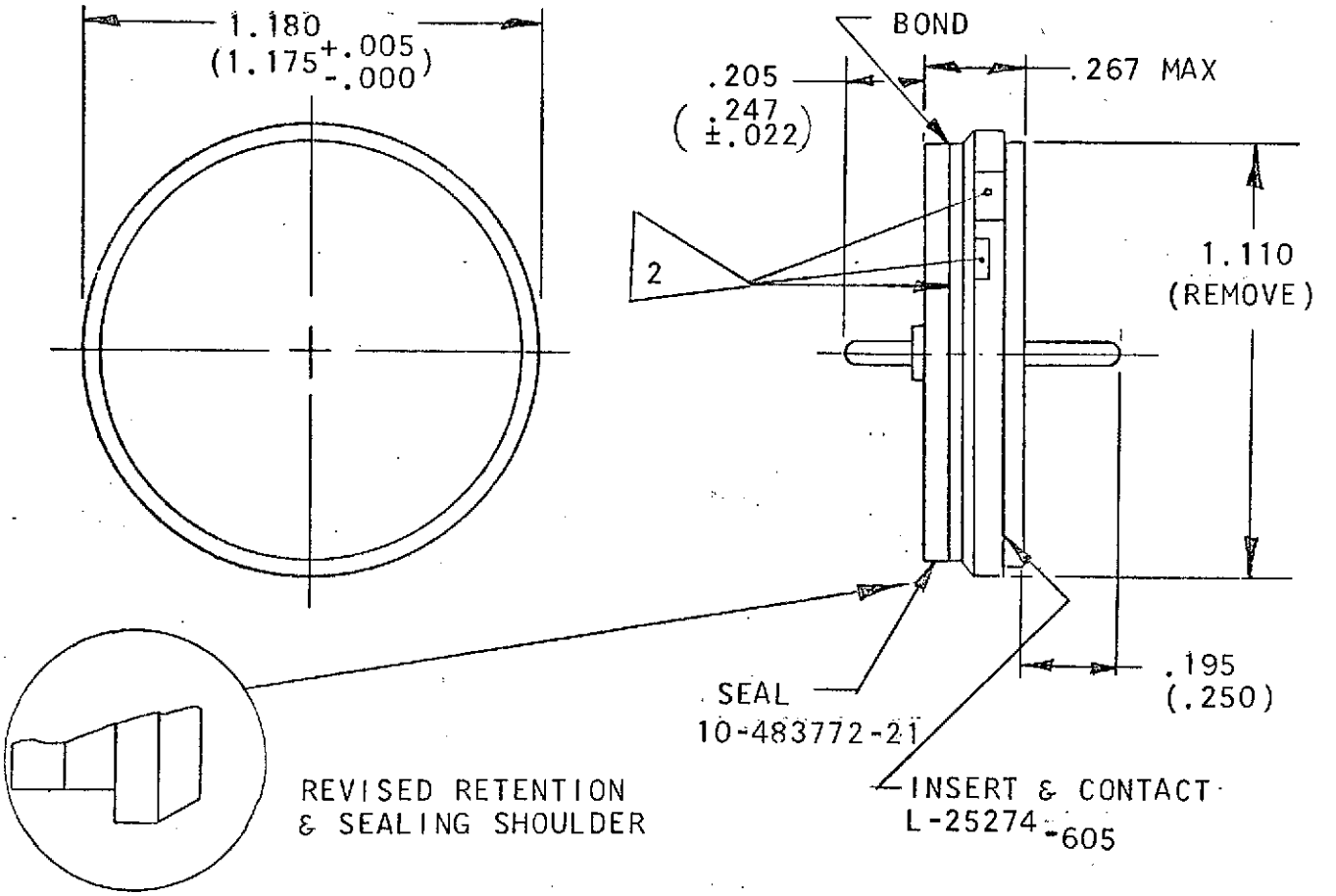
SCALE	WT	REF	SHEET
NONE			

[L-25274-604]

NEXT ASSEMBLY

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A_1	———	———	———
A_2	CHANGED SEAL P/N ECN; CNR		
A_3	WAS L-25274-606 ECN; CNR	4-26-74	MacAvoy
A_4	Rev. Picture	6-3-74	MacAvoy
A_5	ADDED DIMENSIONS ECN; CNR	8-30-74	
A_6	REVISED ECN; CNR	2-3-75 BARTKOW	



2. FULL SHOULDER GATE RELOCATED.
1.( )DIMENSIONS ARE PROPOSED CHANGES TO ACTUAL MEASURED DIMENSIONS.

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATES
LINEAR DIMENSIONS ARE IN INCHES TOLERANCES: .XXX ± .010 .XX ± .03 .X ± .1 ANGLES ± 2° OTHER STANDARDS PER 9-3800 AND MIL-D-1000. NOTE REF ◁	PREPARED A. HANNI	7-2-73
	CHECKED	
MATERIAL SPEC	MATERIAL	
	APPROVED D. MacAvoy	7-9-73
PROCESS SPEC	APPROVED	

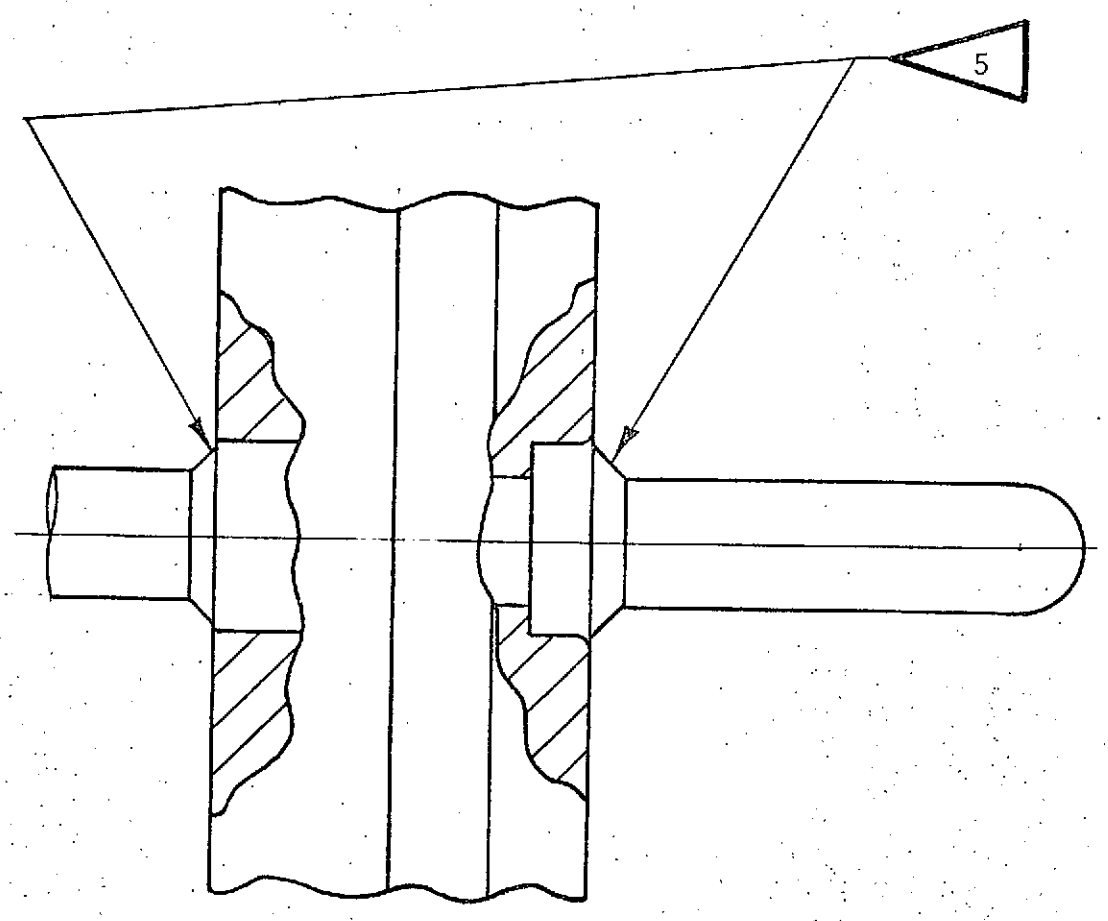
The Bendix Corporation
Electrical Components Division
Sidney, New York

L

INTERFACIAL INSERT ASSEMBLY
FOR USE ON MODIFIED MIL-C-26482 SERIES II SHELLS SIZE 22

SIZE	CODE IDENT NO.	
A	77820	L-25274-604

SCALE	WT	REF	SHEET
NONE			



VIEW H
ENLARGED

5. EITHER OR BOTH FACES OF CONTACT MAY BE DISTORTED DUE TO CLAMPING IN THE MOLD.

4. TRIM GATES .000-.005 BELOW C. GATE NOT TO EXCEED .020 IN WIDTH.

3. NO FLASH PERMISSIBLE ON INDICATED AREA OF CONTACTS.

2. USING WHITE INK PRINT PER 9-3856-6 (PROCEDURE I OR II) IDENTIFYING LETTERS AND NUMERALS IN ACCORDANCE WITH AND IN POSITION SHOWN ON L-21822-22. ON THE REAR FACE OF INSERT IT IS PERMISSIBLE TO OMIT INSERT ARRANGEMENT NUMBER AND TRADEMARK. CONTACT IDENTIFICATION ON REAR FACE MUST INCLUDE ALL LETTERS AND NUMERALS LOCATED ON VERTICAL CENTERLINE AND OUTER PERIPHERY IF IDENTIFIED ON L-21822-21. LETTER HEIGHT TO BE .047 APPROX UNLESS OTHERWISE SPECIFIED ON L-21822-21.

1. SPECIFIED GENERAL TOLERANCES:

   CORNERS SHARP .000-.010
   CONCENTRICITY .005 TIR (RFS)

NOTES:

SIZE	CODE IDENT NO.	
A	77820	L-25274-605

REV SYM	A1	SCALE	WT	REF	SHEET
					2

LABORATORY DATA SHEET

TEST		DATE OF TESTS	REPORT NUMBER
INSULATION RESISTANCE		8-20-74	
TEST SPECIMEN (S) QTY 15 INTERFACIAL INSERTS W/O SHELL		TEMP. +74°F / R.H. 41%	ECL
L-25274-604	LT. 3735	SPEC. MIL-C-26482F	PARA. 4.6.8.1

TEST EQUIPMENT	CAL. DATE	DUE DATE	SPEC. LIMITS
Bx Automatic Conn. Tester E0054	5-28-74	12-2-74	> 5000 MEGOHMS

TEST CONDITIONS
METHOD 302
CONDITION B
MIL-STD-202E

SAMPLE #	>5000 (MEGOHMS)
1	PASS
2	PASS
3	PASS
4	PASS
5	PASS
6	PASS
7	PASS
8	PASS
9	PASS
10	PASS
11	PASS
12	PASS
13	PASS
14	PASS
15	PASS

REF.

Bendix Electrical Components Division
Sidney, New York 13838

TESTED BY [signature]
APPROVED BY
WITNESSED BY

LABORATORY DATA SHEET

TEST	DATE OF TESTS	REPORT NUMBER
DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)	5-20-74	
TEST SPECIMEN (S) QTY 15 INTERFACIAL INSERTS W/O SHELL	TEMP. 74°F / R.H. 41%	ECL
L-25274-604 LT. 3735	SPEC. MIL-C-26482E	PARA. 4.6.10.1
TEST EQUIPMENT / CAL. DATE / DUE DATE	SPEC. LIMITS	
BK AUTOMATIC CONN. TESTER F1680 — 8-8-74 — 9-6-74	TEST CONDITIONS: METHOD 301, MIL-STD-202E	

THE DIELECTRIC WITHSTANDING VOLTAGE WAS APPLIED BETWEEN EACH CONTACT AND ALL OTHER CONTACTS IN COMMON.

THE TEST VOLTAGE WAS GRADUALLY APPLIED AT RATE OF 500 VOLTS PER SECOND, UNTIL A MAXIMUM VOLTAGE OF 2300 VAC RMS WAS ATTAINED.

THE MAXIMUM TEST VOLTAGE WAS MAINTAINED FOR ONE MINUTE.

NO EVIDENCE OF FLASHOVER, BREAKDOWN, OR LEAKAGE CURRENT IN EXCESS OF ONE MILLIAMPERE.

REF.	Bendix Electrical Components Division	TESTED BY
	2 Sidney, New York 13838	E.C. Bolenbaugh
		APPROVED BY
		WITNESSED BY

LABORATORY DATA SHEET

TEST			DATE OF TESTS	REPORT NUMBER
CONTACT RESISTANCE			8-21-74	
TEST SPECIMEN (S) QTY 2 WIRED 10-453523-215 INSERTS			TEMP. +75°F / R.H. 36%	ECL Get
QTY 1 L-25274-004 INTERFACIAL INSERT		LT. 3735	SPEC. MIL-C-26482E	PARA. 4.6.5
TEST EQUIPMENT	CAL. DATE	DUE DATE	SPEC. LIMITS	
KEPCO POWER SUPPLY E1775	6-28-74	7-1-75	45 MILLIVOLTS	
3450A H.P. MULTIMETER E1822	4-11-74	10-8-74	TEST CONDITIONS 6" METHOD	
9820 H.P. CALCULATOR	—	—	10 AMPERES DC	
			MATED ASSEMBLIES	

STAT. ANALYSIS
DATA IN MV

	37.49
	36.97
	36.89
	36.89
	38.36
	37.43
	37.92
	37.09
	37.56
	37.04
	37.34
	36.64
	37.98
	36.57
	36.91
	36.72
	37.95
	40.00
	36.77
	37.04
	37.00
SAMPLES=	21
MAXIMUM=	40.00
AVERAGE=	37.36
MINIMUM=	36.57
STD. DEV.=	.78
3S U.C.L.=	39.70
3S L.C.L.=	35.02

ORIGINAL PAGE IS
OF POOR QUALITY

REF.		TESTED BY
	Bendix Electrical Components Division	APPROVED BY
	3 Sidney, New York 13838	WITNESSED BY

LABORATORY DATA SHEET

TEST	DATE OF TESTS	REPORT NUMBER
CONTACT RETENTION	8-22-74	
TEST SPECIMEN (S) QTY 15 NASA INTERFACIAL INSERTS	TEMP. ~75°F / R.H. 38%	ECL
L-25274-604	LT. 3735	SPEC. / PARA.

TEST EQUIPMENT	CAL. DATE	DUE DATE	SPEC. LIMITS
INSTRON TTC. W/EXTENSOMETER PG1050	3-28-74	10-4-74	
INSTRON CALIB. WEIGHTS PG1450	4-26-74	5-17-76	TEST CONDITIONS: LOAD APPLIED TO FRONT OF DOUBLE PIN CONTACT. (INTERFACIAL SEAL SIDE)

SAMPLE # CONTACT #	LOAD @ .015 DEFL. (POUNDS)	DEFL. @ 4 LBS. LOAD (INCHES)		SAMPLE # CONTACT #	LOAD @ .015" DEFL. (POUNDS)	DEFL. @ 4 LBS. LOAD (INCHES)	
1A	3.8	.016		9W	3.3	.019	
1C	3.3	.020		9S	3.1	.020	
2P	2.7	.024		10S	2.5	.025	
2R	2.8	.025		10T	2.6	.024	
3D	2.8	.021		11T	3.1	.020	
3E	2.6	.023		11U	2.7	.022	
4X	3.0	.022		12W	3.6	.017	
4S	2.9	.023		12V	3.0	.022	
5A	2.4	.027		13J	2.4	.025	
5B	2.2	.027		13H	3.0	.021	
6C	2.6	.025		14R	2.6	.023	
6D	2.5	.026		14S	2.9	.022	
7H	2.6	—		15C	2.2	.025	
7J	3.0	—		15D	2.4	.024	
8N	2.4	.025		Average	2.80	.0227	
8M	2.7	.022					

REF.

Bendix Electrical Components Division
Sidney, New York 13838

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TESTED BY E. R. Schenker

APPROVED BY

WITNESSED BY

LABORATORY DATA SHEET

TEST: CONTACT RETENTION		DATE OF TESTS: 8-22-74	REPORT NUMBER:
TEST SPECIMEN (S): QTY. 15 NASA INTERFACIAL INSERTS		TEMP. +25°F / R.H. 38%	ECL / EPL
L-25274-604	LT. 3735	SPEC.	PARA.

TEST EQUIPMENT	CAL. DATE	DUE DATE
INSTRON TTC W/EXTENSOMETER RG1050	3-28-74	10-4-74
INSTRON CALIB. WEIGHTS RG1450	4-26-74	5-17-76

SPEC. LIMITS:

TEST CONDITIONS: LOAD APPLIED TO REAR OF DOUBLE PIN CONTACT.

SAMPLE # CONTACT #	LOAD @ .015" DEFL. (POUNDS)	DEFL @ 4 LBS LOAD (INCHES)		SAMPLE # CONTACT #	LOAD @ .015" DEFL. (POUNDS)	DEFL @ 4 LBS LOAD (INCHES)	
1 N	2.7	.039		9 X	1.8	.029	
1 L	1.0	.042		9 U	1.9	.028	
2 U	1.3	.047		10 P	1.9	.029	
2 V	1.7	.045		10 R	1.9	.031	
3 L	0.7	.039		11 C	1.5	.037	
3 K	1.4	.033		11 D	1.6	.035	
4 G	1.2	.041		12 X	1.7	.032	
4 H	1.7	.041		12 S	1.8	.031	
5 N	2.0	.026		13 E	1.8	.033	
5 M	2.2	.027		13 D	1.8	.034	
6 U	1.6	.032		14 S	1.3	.037	
6 H	1.7	.037		14 T	2.1	.030	
7 V	1.5	.032		15 K	1.2	.044	
7 K	1.0	.042		15 J	1.6	.040	
8 A	1.1	.039		Average	1.61	.0354	
8 B	1.5	.039					

REF.

Bendix Electrical Components Division
Sidney, New York 13838

5

TESTED BY: E. R. Parker

APPROVED BY:

WITNESSED BY:

LABORATORY DATA SHEET

TEST: INSERTION & REMOVAL FORCES		DATE OF TESTS: 9-11-74	REPORT NUMBER:
TEST SPECIMEN (S): INTERFACIAL INSERTS L-25274-604		TEMP. / R.H.	ECL / RPL
SAMPLE #1,2,3	LT. 3735	SPEC:	PARA.
TEST EQUIPMENT: INSTRON TTC. PG1050	CAL. DATE: 9-25-74 / DUE DATE: 10-4-74	SPEC. LIMITS	
		TEST CONDITIONS	

SHELL INSIDE DIAMETER (INCHES)	SAMPLE #	PEAK INSERTION FORCE (LBS)	PEAK REMOVAL FORCE (LBS)	NOTES
1.170	1	8.9	4.8	(1)
	2	12.4	7.2	(1)
	3	7.6	4.3	(1)
1.163	1	19.6	9.6	(1)
	2	23.0	10.8	(1)
	3	18.6	9.3	(1)
1.155	1	31.5	12.0	(2)
	2	28.6	10.9	(2)
	3	24.0	12.2	(1)
	1	24.1	11.7	(1) (3)

NOTES: (1) INTERFACIAL INSERT Pulled OUT OF SHELL WITH INSERT REMOVAL
(2) " " REMAINED IN " " " "
(3) " " REVERSED

REF.	Bendix Electrical Components Division, Sidney, New York 13838	TESTED BY: E. P. Robertson
	6	APPROVED BY:
		WITNESSED BY:

72-254-2

LABORATORY DATA SHEET

TEST: INSERTION FORCES		DATE OF TESTS: 12-17-74	REPORT NUMBER
TEST SPECIMEN (S): #11 & 12 Interfacial Effects 1-2527466		TEMP: 72°F R.H.: 40%	ECL PSR
SOCKET INSERT 10-42352-218	LT. 3725	SPEC.	PARA.
TEST EQUIPMENT: Instron PTC PG1050	CAL. DATE: 10-3-74 DUE DATE: 4-10-75	SPEC. LIMITS	
		TEST CONDITIONS: SOCKET INSERT ASS'Y W/ FULL COMPLIMENT OF CONTACTS.	

SAMPLE	PEAK INSERTION FORCE (LBS)
II	
11	15.7
12	15.9

REF.	Bendix Electrical Components Division, Sidney, New York 13838	TESTED BY: E. P. Schreiber APPROVED BY: WITNESSED BY:

72-254-2

LABORATORY DATA SHEET

TEST: Contact Retention To Destruction		DATE OF TESTS: 10-24-74		REPORT NUMBER
TEST SPECIMEN (S): NASA Interfacial Inserts 1-25274-604		TEMP. 72°F	R.H. 41%	ECL / EDL
	LT. 3735	SPEC.		PARA.

TEST EQUIPMENT		CAL. DATE	DUE DATE
Instron TTC	PB1050	10-3-74	4-10-75

SPEC. LIMITS

TEST CONDITIONS

SAMPLE #	CONTACT #'S	LOAD (LBS) APPLIED TO FRONT	FRONT	REAR	REAR
3	AB VU	8.7	8.2	7.7	7.7
4	TU BC	8.4	7.8	6.9	6.6
5	LK XU	7.9	7.9	8.9	9.4
6	XS KL	8.6	8.4	7.1	7.4
7	EF UV	8.4	7.4	7.7	7.6
8	PR ST	8.3	8.4	8.1	7.5
9	AB WX	14.2	13.4	15.4	16.1
10	XT LK	10.7	12.8	12.9	13.8
14	WV SR	7.8	7.6	7.9	7.9
15	JH EE	8.0	8.2	6.8	6.9

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